

vehicle interior monitoring system of this invention and the vehicle entertainment system.

[0146] **FIG. 5A** is a schematic representation of a vehicle in which the entertainment system utilizes hypersonic sound.

[0147] **FIG. 6** is a side view with parts cutaway and removed of a vehicle showing the passenger compartment containing a driver and a preferred mounting location for an occupant identification system and including an antenna field sensor.

[0148] **FIG. 7A** is a functional block diagram of the ultrasonic imaging system illustrated in **FIG. 1** using a microprocessor, DSP or field programmable gate array (FPGA).

[0149] **FIG. 7B** is a functional block diagram of the ultrasonic imaging system illustrated in **FIG. 1** using an application specific integrated circuit (ASIC).

[0150] **FIG. 8** is a side view with parts cutaway and removed of a vehicle showing the passenger compartment containing a box on the front passenger seat and a preferred mounting location for an occupant and rear facing child seat presence detector and including an antenna field sensor.

[0151] **FIG. 9** is a side view with parts cutaway and removed of a vehicle showing the passenger compartment containing a driver and a preferred mounting location for an occupant position sensor for use in side impacts and also of a rear of occupant's head locator for use with a headrest adjustment system to reduce whiplash injuries in rear impact crashes.

[0152] **FIG. 10** is a side view with parts cutaway and removed of a vehicle showing the passenger compartment containing a front passenger and a preferred mounting location for an occupant head detector and a preferred mounting location of an adjustable microphone and speakers and including an antenna field sensor in the headrest for a rear of occupant's head locator for use with a headrest adjustment system to reduce whiplash injuries, in particular, in rear impact crashes.

[0153] **FIG. 11** is a side view with parts cutaway and removed of a subject vehicle and an oncoming vehicle, showing the headlights of the oncoming vehicle and the passenger compartment of the subject vehicle, containing detectors of the driver's eyes and detectors for the headlights of the oncoming vehicle and the selective filtering of the light of the approaching vehicle's headlights through the use of electro-chronic glass, organic or metallic semiconductor polymers or electropheric particulates (SPD) in the windshield.

[0154] **FIG. 11A** is an enlarged view of the section 11A in **FIG. 11**.

[0155] **FIG. 12** is a side view with parts cutaway and removed of a vehicle and a following vehicle showing the headlights of the following vehicle and the passenger compartment of the leading vehicle containing a driver and a preferred mounting location for driver eyes and following vehicle headlight detectors and the selective filtering of the light of the following vehicle's headlights through the use of electrochromic glass, SPD glass or equivalent, in the rear view mirror.

[0156] **FIG. 12A** is an enlarged view of the section designated 12A in **FIG. 12**.

[0157] **FIG. 12B** is an enlarged view of the section designated 12B in **FIG. 12A**.

[0158] **FIG. 13** is a side view with parts cutaway and removed of a vehicle showing the passenger compartment containing a driver, a shoulder height sensor and a seatbelt anchorage adjustment system.

[0159] **FIG. 14** is a side view with parts cutaway and removed of a seat in the passenger compartment of a vehicle showing the use of resonators or reflectors to determine the position of the seat.

[0160] **FIG. 15** is a side view with parts cutaway and removed of the passenger compartment of a vehicle showing the use of resonators or reflectors to determine the position of the driver seatbelt.

[0161] **FIG. 16** is a side view with parts cutaway and removed of the passenger compartment of a vehicle showing the use of a resonator or reflector to determine the extent of opening of the driver window and of a system for determining the presence of an object, such as the hand of an occupant, in the window opening.

[0162] **FIG. 16A** is a side view with parts cutaway and removed of the passenger compartment of a vehicle showing the use of a resonator or reflector to determine the extent of opening of the driver window and of another system for determining the presence of an object, such as the hand of an occupant, in the window opening.

[0163] **FIG. 17** is a side view with parts cutaway and removed of the passenger compartment of a vehicle showing the use of a resonator or reflector to determine the extent of opening position of the driver side door.

[0164] **FIG. 18** is a side view with parts cutaway and removed showing schematically the interface between the vehicle interior monitoring system of this invention and the vehicle security system.

[0165] **FIG. 19** is a side view with parts cutaway and removed showing schematically the interface between the vehicle interior monitoring system of this invention and an instrument panel mounted inattentiveness warning light or buzzer and reset button.

[0166] **FIG. 20** is a block diagram of an antenna-based near field object discriminator.

[0167] **FIG. 21** illustrates the interior of a passenger compartment with a rear view mirror, a camera for viewing the eyes of the driver and a large generally transparent visor for glare filtering.

DETAILED DESCRIPTION OF THE INVENTION

[0168] 1. Basic System

[0169] Referring to the accompanying drawings wherein the same reference numerals refer to the same or similar elements, **FIG. 1** is a side view, with parts cutaway and removed of a vehicle showing the passenger compartment containing a rear facing child seat 110 on a front passenger seat 120 and a preferred mounting location for a first embodiment of a vehicle interior monitoring system in